

Patent Claims

1. Process for a correspondence analysis in image data sets in order to identify within two image data sets $i(20)$ and $j(21)$ image points pixels u_i, v_i, u_j corresponding with each other,

wherein in a first step the image data set i is transformed with a signature operator in such a manner, that for each pixel u_i, v_i a signature string (27) is computed and recorded in a signature table (22) together with the pixel coordinates,

wherein in a subsequent step each pixel u_j, v_j of the other image data set j is transformed using the same signature operator, whereupon the resulting signature strings are recorded together with the respective pixel coordinates in an additional signature table (23), and

wherein the entries in the two signature tables (22, 23) are checked with respect to whether signature strings exist which can be found in both tables, whereupon in these cases, for the coordinates associated with the signature strings (27), a correspondence hypothesis (25) is generated and stored in a hypothesis list (26) for further processing.

2. Process according to Claim 1, thereby characterized, that a census operator is employed as the signature operator, which corresponds to a non-linear transformation of the image data (20, 21) surrounding an image point.

3. Process according to one of the preceding claims, thereby characterized, that the signature tables (22, 23) are organized in the form of a hash table.

4. Process according to one of the preceding claims, thereby characterized, that prior to the recording of a signature string (27) with its associated pixel coordinates in a signature table (22, 23), these are examined with respect to whether a signature string (27) corresponding to the signature string has already been recorded in the table,

whereupon in the cases in which a corresponding signature string (27) has already been recorded, the newest signature string is not recorded, but rather only the pixel coordinates associated therewith are added as supplemental pixel coordinates to the already existing table entry of the corresponding signature string.

5. Process according to one of the preceding claims, thereby characterized, that the process accesses a memory, in which in particular applications-specific signature strings are recorded, of which, upon their occurrence, it can be assumed that pixels associated with such a signature string (27) need not be taken into consideration during the correspondence analysis, and that prior to the recording of a signature string (27) with its associated pixel coordinates in a signature table (22, 23), this is checked with respect to whether it corresponds with a signature string already recorded in this memory, whereupon in this case, the signature string (27) and its associated pixel coordinates are not recorded or entered in the signature table (22, 23).

6. Process according to one of the preceding claims, thereby characterized, that, prior to the generation of the correspondence hypothesis, the entry of the signature string (27) in the signature tables (22, 23) is checked with regard to whether a signature string occurs frequently in one of the signature tables (22, 23), whereupon in this case, the relevant signature string (27) is not considered for a generation of a correspondence hypothesis.

7. Process according to one of the preceding claims, thereby characterized, that prior to the generation of the correspondence hypothesis of corresponding signature strings appearing in both signature tables (22, 23), supplementally the image data and/or image recording situation relevant parameters are taken into consideration, and that a correspondence hypothesis is generated only when these supplementally to be considered parameters of the two individual image points taken into consideration in the correspondence analysis do not deviate beyond a predetermined value.

8. Process according to Claim 7, thereby characterized, that the light intensity of the individual image points describes one of the supplementally to be considered parameters.

9. Process according to Claims 7 or 8, thereby characterized, that one of the supplementally to be considered parameters is the pixel coordinates of the image points with corresponding signature strings (27).

10. Process according to Claim 9, thereby characterized, that it is herein supplementally taken into consideration whether the relevant image points are located in the center or on the edge area of the image described by the image data i (20) or j (21), wherein in the case of image data which are located in the edge area of the image data set (20, 21) larger deviations of the pixel coordinates can be permitted.

11. Device for correspondence analysis in image data sets in order to identify within two image data sets i j image points (pixels) u_i v_i and u_j v_j corresponding to each other, wherein the device includes a signature operator, by means of which both the image data set i (20) as well as the image data set j (21) are transformed in such a manner, that for each of the pixels u_i v_i and u_j v_j a signature string (27) is computed,

wherein the device further includes a memory unit, which is so designed, that it is physically or virtually divided into two memory areas, which respectively include one of the signature tables (22, 23) associated with one of the image data sets i, j , in which the signature strings (27) determined by means of the signature operator can be stored with their associated pixel coordinates, and

wherein the device includes, downstream of the memory unit, a device for generation of correspondence hypothesis (25) associated with the signature strings (27), which is provided with a memory (26) for recording these corresponding hypothesis in the form of a hypothesis list.

12. Device according to Claim 11, thereby characterized, that the signature operator is in communication with a memory unit, in which in particular application-specific signature strings can be recorded, from the occurrence of which it can be presumed that the pixel associated with one such signature string (27) need not be taken into consideration in the correspondence analysis, wherein upon the existence of one such signature string (27) a transfer of the signature string into the signature table (27) is prevented.

13. Use of the process or the device according to one of the preceding claims for correspondence analysis in the computation of the optical flow within a sequence of camera image data.

14. Use of the process or the device according to one of the preceding claims for correspondence analysis within an image pair in stereo image processing.